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NOTES ON THE GENUS MANNINGIA WITH DESCRIPTION OF A NEW SPECIES (CRUSTACEA: STOMATOPODA)

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One of the recent trends in the study of stomatopod crustaceans has been a critical re-evaluation of generic characters (Serène, 1962; Manning, 1963; Holthuis, 1964). In setting this trend, Serène (1962) reviewed the genus *Pseudosquilla* Dana and showed it to be a conglomerate of several groups of species that should be recognized as distinct genera. One of the genera erected by Serène was the monotypic *Manningia*, which originally contained only *Pseudosquilla pilaensis* de Man.

In a recent study of three specimens of *Manningia* from Australia, I re-examined five of the seven specimens of *Manningia* reported in the literature. The Australian specimens proved to be a distinct species, *M. notialis*, which has been described elsewhere (Manning, 1966). The present paper includes comments on specimens from other localities in the Indo-West Pacific area.

Since its description by de Man in 1888, *Pseudosquilla pilaensis* has been recorded only six times from widely scattered areas in the Indo-West Pacific. The following specimens are known (those marked with an asterisk were illustrated):

original reference	*sex, size*	*location*	*present identification*
de Man, 1888	1(?), TL 88.0	Elphinstone Island, Mergui Archipelago	*M. pilaensis*
Nobili, 1906	1 ♀, broken	Gulf of Aden	*Manningia*, new species?
Kemp, 1913	1 ♀, TL 48.0	Elphinstone Island, Mergui Archipelago	*M. pilaensis*
Schmitt, 1929	1 ♂, TL 58.0*	Amoy, China	*M. pilaensis*
Gravier, 1937	1 ♂, TL 32.0*	Viet Nam	*M. serenei*, new species
Dollfus, 1938	1 ♂, TL 63.0*	Amoy, China	*M. pilaensis*
Stephenson, 1953	1 ♂, TL 50.0	Queensland, Australia	*M. notialis*

Other authors, including Serène (1962) and Ingle (1963), re-illustrated parts of one or more of the above specimens. A comparison of these illustrations revealed several discrepancies, some of which are cited below.

Gravier (1937) figured a small specimen from the Poulo Condore Islands in which the third lateral carinae of the telson were subdivided into three erect spines; Serène (1962) refigured Gravier's specimen and showed an uninterrupted carina terminating in a single spine. Gravier's specimen has a rounded lobe between the spines of the basal prolongation of the uropod; the lobe is lacking in the Chinese specimen of *M. pilaensis* figured by Schmitt (1929) and Ingle (1963). These are among the discrepancies noted in the literature.

All but the two specimens of *M. pilaensis* from Elphinstone Island have been examined for this study. *M. pilaensis* is redescribed, a new species from the Poulo Condore Islands, *M. serenei*, is described, and the single, mutilated specimen from the Gulf of Aden, which probably represents a new species, is briefly characterized but not named.

The descriptions given herein do not include generic characters, which are summarized separately in the generic definition. Synonymies include all references in the literature. Measurements of total length (TL) are made along the midline, from the apex of the rostral plate to the bases of the movable submedian teeth of the telson. Telson length is also measured to the bases of the submedian teeth. Carapace length (CL) is measured along the midline and does not include the rostral plate. In general, appendage setation is not shown in the illustrations; on most of the specimens the setae are badly damaged.

I would like to thank R. W. Ingle of the British Museum (Natural History) (BMNH) and J. Forest of the Muséum National d'Histoire Naturelle, Paris (MNHNP), for making available on loan specimens

from their institutions. The illustrations are from the pen of my wife, Lilly. Support of the National Science Foundation under grant GB–1602 is gratefully acknowledged.

Manningia Serène, 1962

Manningia Serène, 1962, p. 20.—Manning, 1963, p. 313.

DEFINITION.—Size moderate, TL 90 mm or less; body smooth, depressed but compact; eyes of moderate size, cornea bilobed, set very obliquely on stalk, outer margin of stalk longer than inner; rostral plate usually pentagonal, apical spine present or absent; antennal protopod with papillae; carapace narrowed anteriorly, unarmed, cervical groove indicated on lateral plates only; carapace with marginal carinae, not reflected, along posterior margins of lateral plates; thoracic somites with at most 1 pair of lateral dorsal carinae, lateral margins of sixth and seventh somites rounded; eighth thoracic somite with low, short, median ventral keel; 5 epipods present; mandibular palp present; propodi of last 3 thoracic appendages as long as or longer than broad, that of last appendage with ventral brush of setae; raptorial claw stout, dactylus armed with 4 teeth, outer margin of dactylus with strong basal notch; propodus stout, fully pectinate, with 3 movable spines at base, proximal one longest; dorsal ridge of carpus divided into 2 strong teeth; merus stout, much shorter than ischium, with or without inferodistal spine; endopods of walking legs 2-segmented, elongate; abdomen depressed, smooth, second to fourth somites each with obscure longitudinal lateral grooves; fifth and sixth abdominal somites carinate, sixth with 3 pairs of dorsal spines; telson much broader than long, with median carina and 5 pairs of lateral carinae on dorsal surface; submedian teeth of telson with bases appressed, apices movable; submedian denticles absent, 2 broad intermediate denticles and 1 broad lateral denticle present, outer intermediate and lateral denticle each with ventral spinule; basal segment of uropod with dorsal and lateral carinae, dorsal terminating in distal spine; distal segment of exopod longer than proximal; endopod elongate; basal prolongation produced into 2 spines, inner longer, with or without intervening lobe; inner margin of basal prolongation with spinules.

TYPE-SPECIES.—*Pseudosquilla pilaensis* de Man, 1888, by monotypy.

DISCUSSION.—Within the *Pseudosquilla* complex of genera including *Pseudosquilla*, *Pseudosquillopsis*, *Parasquilla*, *Manningia*, *Coronidopsis*, *Eurysquilloides*, and *Eurysquilla*, discussed by Manning (1963), *Manningia* seems to be most closely related to *Coronidopsis* Hansen. Both of these genera share an eye with bilobed cornea and an outer

margin longer than the inner; a raptorial claw with four teeth on the dactylus and two dorsal teeth on the carpus; a relatively broad, flattened body, with the abdomen partially carinate; a telson broader than long, with submarginal intermediate and lateral denticles; and a basal prolongation of the uropod with the inner spine the longer, armed with spinules on its inner margin. The single species of *Coronidopsis*, *C. biscuspis* Hansen, differs from the three species now recognized in *Manningia* in having an anteriorly bifurcate rostral plate and numerous dorsal spinules on the telson.

The terminology of the carinae of the telson proposed by Kemp (1913, p. 13, text-fig. 4) and currently used in this and related genera is illogical in that dorsal carinae may bear names different from the marginal teeth on which they occur. Thus, as used by Kemp, the intermediate dorsal carina extends onto the submedian marginal tooth and the first lateral carina extends onto the intermediate marginal tooth. In the carinal nomenclature used herein by me, the name of a dorsal carina is derived from that of the marginal tooth onto which it extends. The proposed nomenclature of the carinae of the telson in *Manningia* and related genera compared with that proposed by Kemp (1913) is as follows:

Kemp, 1913	*present*	*remarks*
submedian	accessory median	parallel to median carina
second submedian	second accessory median	paralled to median carina, present in *Odontodactylus* only
intermediate	submedian	on submedian marginal tooth
first lateral	intermediate	on intermediate marginal tooth
second lateral	lateral	on lateral marginal tooth
marginal	marginal	

Key to Species of *Manningia*

1. Rostral plate pentagonal 2
   Rostral plate ovate . . . . . **Manningia** species (p. 5)
2. Rostral plate lacking apical spine; merus of raptorial claw lacking inferodistal spine . . . . . **M. notialis** Manning, 1966 [Australia]
   Rostral plate with apical spine; merus of raptorial claw with inferodistal spine 3
3. Intermediate carinae of telson entire; basal prolongation of uropod without broad, rounded lobe between apical spines . . . . . **M. pilaensis** (p. 6)
   Intermediate carinae of telson divided into spined lobes; basal prolongation of uropod with rounded lobe between apical spines. **M. serenei,** new species (p. 9)

Manningia species

FIGURE 1

Pseudosquilla pilaensis.—Nobili, 1906, p. 336.—Dawydoff, 1952, p. 146 [discussion; not *P. pilaensis* de Man, 1888].
Manningia pilaensis.—Serène, 1962, text-fig. 5D.

MATERIAL.—1 broken ♀, CL 7.0; Djibouti or Obock, French Somaliland, Gulf of Aden; Dr. Jousseaume, collector; MNHNP.

DESCRIPTION.—Rostral plate ovate, anterolaterally rounded; apical spine absent (possibly broken).

Antennal scale slender, margin complete setose; antennal peduncle with one ventral papilla.

Walking legs slender, endopod increasing in length posteriorly.

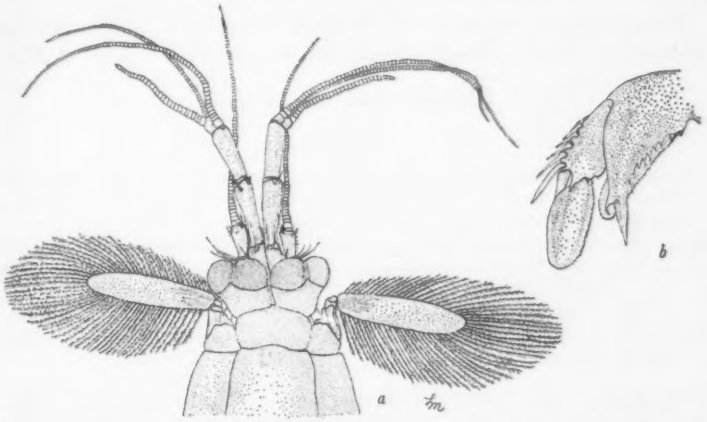

FIGURE 1.—*Manningia* species, female, Gulf of Aden: *a*, anterior portion of body; *b*, basal prolongation of uropod, ventral view (uropodal setae damaged, omitted).

Fifth abdominal somite with posterolateral spines, 3 lateral carinae present on each side, upper and lower subparallel and as long as somite, middle carina shorter; sixth somite with 6 pairs of posterior spines, with unarmed accessory carina present dorsally between submedian and intermediate carinae as well as between intermediates and laterals.

Uropodal exopod with 8–9 movable spines on outer margin of penultimate segment, last spine extending past midlength of distal segment; basal prolongation of uropod with 6 spinules on inner margin and poorly marked lobe present between distal spines.

COLOR.—Completely faded.

MEASUREMENTS.—Summarized in table 1.

DISCUSSION.—This small, fragmented specimen, which lacks a telson and raptorial claws, resembles *M. pilaensis* in most features, but differs as follows: (1) the rostral plate is ovate rather than pentagonal and is broadly rounded anterolaterally instead of angled; (2) there is but one papilla on the antennal protopod; and (3) there is a small, rounded lobe present between the spines of the basal prolongation of the uropod.

A small irregular area on the left side of the rostral plate indicates that it has been damaged and a rostral spine may have been present.

Because of its small size, poor condition, and apparent distinctness from the other species of *Manningia*, it seems best not to discuss this specimen under *M. pilaensis* but to treat it separately in order to call attention to it. Additional specimens from the Gulf of Aden are needed to determine the identity of this specimen.

DISTRIBUTION.—Known only from the single specimen collected at Djibouti or Obock, French Somaliland, in the western Gulf of Aden.

Manningia pilaensis (de Man)

FIGURE 2

Pseudosquilla pilaensis de Man, 1888, p. 296.—Bigelow, 1894, p. 499 [key only].—Kemp, 1913, p. 105.—Schmitt, 1929, p. 140, pl. 19, figs. 12–14.—Dollfus, 1938, p. 201, text-fig. 10.—Ingle, 1963, p. 22.

Not *Pseudosquilla pilaensis*.—Nobili, 1906, p. 336 [= new species from Gulf of Aden discussed above].—Gravier, 1937, p. 193, text-fig. 13 [=*M. serenei*, new species].—Stephenson, 1953, p. 144.—Stephenson and McNeill, 1955, p. 245 [= *M. notialis* Manning].

Manningia pilaensis.—Serène, 1962, p. 20 et seq. [part].—Manning, 1963, p. 313 [discussion].

MATERIAL.—1 ♂, 54.8; Liawutien, on mainland near Amoy, China; May 27, 1923; S. F. Light, collector; USNM 62190. 1 ♂, 61.7; Tsimei, Amoy, China; S. F. Light, collector; BM(NH) Reg. No. 1924.5.27.2.

DESCRIPTION.—Eyes not extending beyond midlength of first segment of antennular peduncle; ocular scales low, rectangular, partially fused along midline.

Antennular peduncle more than ⅔ as long as carapace.

Antennal scale not markedly curved, short, little more than ½ as long as carapace, margins completely setose; antennal protopod with one mesial and one ventral papilla.

Rostral plate pentagonal, with long apical spine.

Merus of raptorial claw with inferodistal spine.

Fifth thoracic somite with inconspicuous lateral processes; sixth and seventh somites with prominent lateral carina on each side; last thoracic somite with blunt lateral lobes; endopods of walking legs increasing in length and slenderness posteriorly.

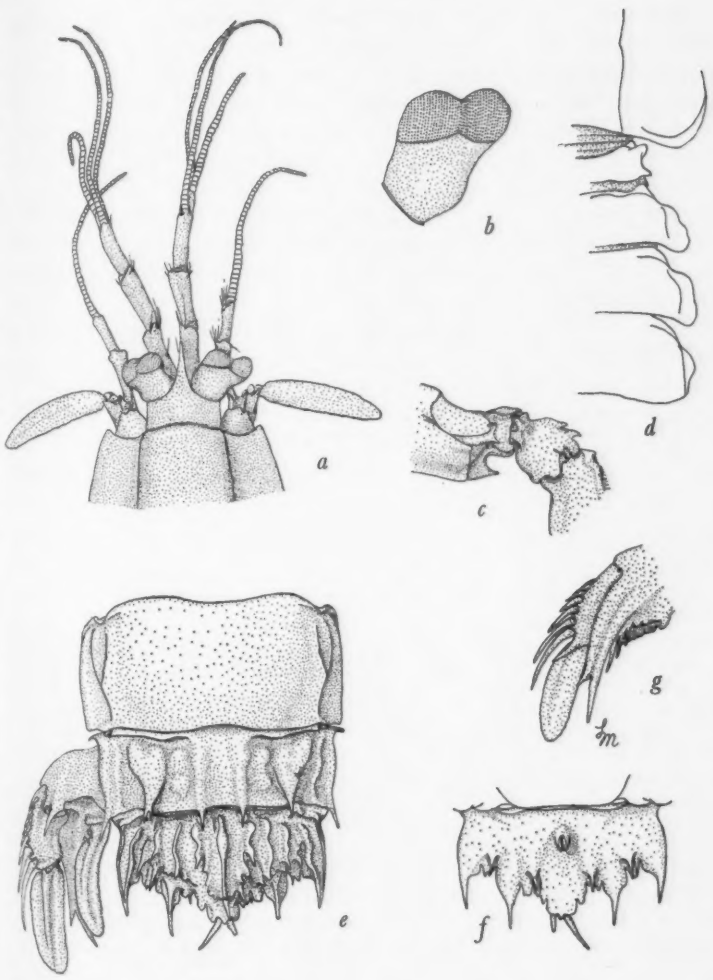

FIGURE 2.—*Manningia pilaensis* (de Man), male, Liawutien, China: *a*, anterior portion of body; *b*, eye; *c*, carpus of raptorial claw; *d*, lateral processes of exposed thoracic somites; *e*, posterior portion of body; *f*, telson, ventral view; *g*, basal prolongation of uropod, ventral view (setae omitted).

Abdomen with longitudinal grooves on second to fifth somites; fifth somite with 3 broad carinae, upper short, parallel to body line, middle oblique, extending to posterior margin, lower swollen, subparallel with upper; posterolateral margin of fifth somite (occasionally fourth) armed with small spine; sixth somite with 6 carinate marginal spines; broad, unarmed accessory carinae present between submedian and intermediate carinae as well as between intermediates and laterals; submedian carinae slender; intermediate carinae very broad, widening anteriorly, sides sharp; lateral carinae swollen, inconspicuous; sixth somite with small lateral spine anterior to articulation of each uropod.

Telson less than twice as broad as long; accessory median carinae subdivided into 3–6 lobes, each armed with slender spine; submedian

TABLE 1.—*Measurements (in mm) of four specimens of* Manningia

	M. pilaensis		*M. serenei*	*Manningia* species Gulf of Aden
Sex	♂	♂	♂	♀
Total length	61.7	54.8	31.5	–
Carapace length	11.6	10.7	5.8	7.0
Rostral length	4.3	4.0	2.2	1.2
Rostral width	3.7	3.4	2.0	2.2
Cornea width	2.5	2.5	1.6	2.2
Antennal scale length	6.1	5.0	2.5	3.7
Antennal peduncle length	8.7	7.9	5.1	–
Fifth abdominal somite width	12.1	10.8	6.5	7.1
Telson length	5.3	4.8	2.7	–
Telson width	9.6	8.8	4.8	–

dorsal carinae with 1–2 denticles ventral to apical spine; intermediate carinae with 1–2 inner and one outer lobes or spinules ventral to each apical spine, outer and/or inner connected to low ridge extending anteriorly around apex; lateral carinae uninterrupted dorsally, with 1–2 subterminal tubercles or spinules; marginal carinae irregular but entire; anterior surface of telson with 1 pair of dorsal, submedian, rounded tubercles; submedian and intermediate marginal teeth with short dorsal carinae.

Uropodal exopod with 8 slender movable spines on outer margin of proximal segment, distal extending past midlength of distal segment; endopod slender, curved; basal prolongation lacking lobe between apical spines; inner margin of basal prolongation with 5 slender spinules.

COLOR.—The color pattern is completely faded in the USNM specimen, but some chromatophores are visible on the one from the British Museum. There are dark chromatophores along the abdominal pleura, with the ventral margin of each pleuron black; the anterior edge of the merus of the claw is black; and the posterior margin of the carapace, last abdominal somite, and telson are outlined in dark pigment.

MEASUREMENTS.—Summarized in table 1.

DISCUSSION.—The presence of the following features will distinguish *M. pilaensis* from the other species of the genus: (1) a slender rostral spine; (2) one mesial and one ventral papilla on the antennal protopod; (3) the inferodistal spine on the merus of the raptorial claw; and (4) the uninterrupted intermediate carinae of the telson. *M. pilaensis* agrees with *M. notialis* and differs from *M. serenei*, new species, as well as the undescribed species from the Gulf of Aden in lacking a rounded lobe between the spines of the basal prolongation of the uropod.

Although de Man (1888) did not illustrate the type, from Elphinstone Island, Mergui Archipelago, he did provide a long and detailed description with which the present specimens agree in all respects.

REMARKS.—The specimens available differ in minor details of telson ornamentation, particularly in the numbers of subterminal tubercles and spinules on the submedian and intermediate dorsal carinae. On the USNM specimen, the right lateral carina recurves anteriorly and terminates in a spine; on the left side a short, spined carina is present in the same location, but it is not connected to the lateral. The left intermediate spine of the sixth abdominal somite is bifurcated on the USNM specimen.

DISTRIBUTION.—*M. pilaensis* is known from the two specimens from Amoy, China, discussed herein, and from two other specimens collected at Elphinstone Island, Mergui Archipelago, eastern Indian Ocean.

Manningia serenei, new species

FIGURE 3

Pseudosquilla pilaensis.—Gravier, 1937, p. 193, text-fig. 13 [not *P. pilaensis* de Man, 1888].

Manningia pilaensis.—Serène, 1962, text-figs. 4, 5C.

HOLOTYPE.—1 ♂, 31.5; reefs, Poulo Condore Island, Viet Nam; Dawydoff, collector; March–April 1931; MNHNP.

DESCRIPTION.—Eyes not extending to end of first segment of antennular peduncle; ocular scales low, rectangular, partially fused along midline.

Antennular peduncle ⅘ as long as carapace.

Antennal scale slender, slightly curved, less than ½ as long as carapace, margins completely setose; antennal protopod with one ventral papilla.

Rostral plate pentagonal, longer than broad, with long apical spine extending to end of cornea.

Merus of raptorial claw with inferodistal spine.

Lateral process of fifth thoracic somite blunt, inconspicuous; lateral processes of next 2 somites rounded, anterolaterally flattened; no dorsal carinae visible on thoracic somites; endopods of walking legs slender, 2-segmented, increasing in length posteriorly, that of first leg broadest.

Second to fifth abdominal somites each with shallow longitudinal grooves laterally; fifth somite with 3 low lateral carinae, upper and lower parallel with body line, middle carina oblique, connected to neither upper nor lower; posterolateral angles of fourth somite acute, those of fifth spined; sixth somite with 3 pairs of marginal spines; submedians each on low carina not extending to anterior margin of somite; intermediates on broad triangular swellings, margins sharp; blunt longitudinal carina present between each intermediate and lateral carina; sixth somite with inconspicuous spine or lobe anterior to articulation of each uropod.

Telson less than twice as broad as long; accessory median carinae interrupted, divided into 3 spined lobes (anterior lobe subdivided on one side); submedian carinae uninterrupted, terminating in strong spines; intermediate carinae divided into at least 2 lobes, posterior spined, with lateral and dorsal subapical denticles; lateral carinae entire; submedian and intermediate marginal teeth each with short dorsal carina.

Uropods broad, curved; proximal segment with strong dorsal and lateral carinae, distal dorsal spine broken on both sides in holotype; proximal segment of outer branch with 8 movable spines, last extending to midlength of distal segment; proximal segment of exopod shorter than distal; endopod curved mesially, tapering distally; basal prolongation with rounded lobe between spines; inner spine of basal prolongation with 5–6 fixed spinules on inner margin.

COLOR.—Completely faded in the holotype.

MEASUREMENTS.—Summarized in table 1.

DISCUSSION.—The chief diagnostic features of *M. serenei* are the interrupted intermediate carinae of the telson, each of which is divided into at least two spined lobes. This feature and the broad, rounded lobe present between the spines of the basal prolongation of the uropod will distinguish *M. serenei* from *M. pilaensis* and *M. notialis*. *M. serenei* resembles *M. pilaensis* and differs from *M. notialis* in having the rostral plate armed anteriorly and in having an inferodistal spine

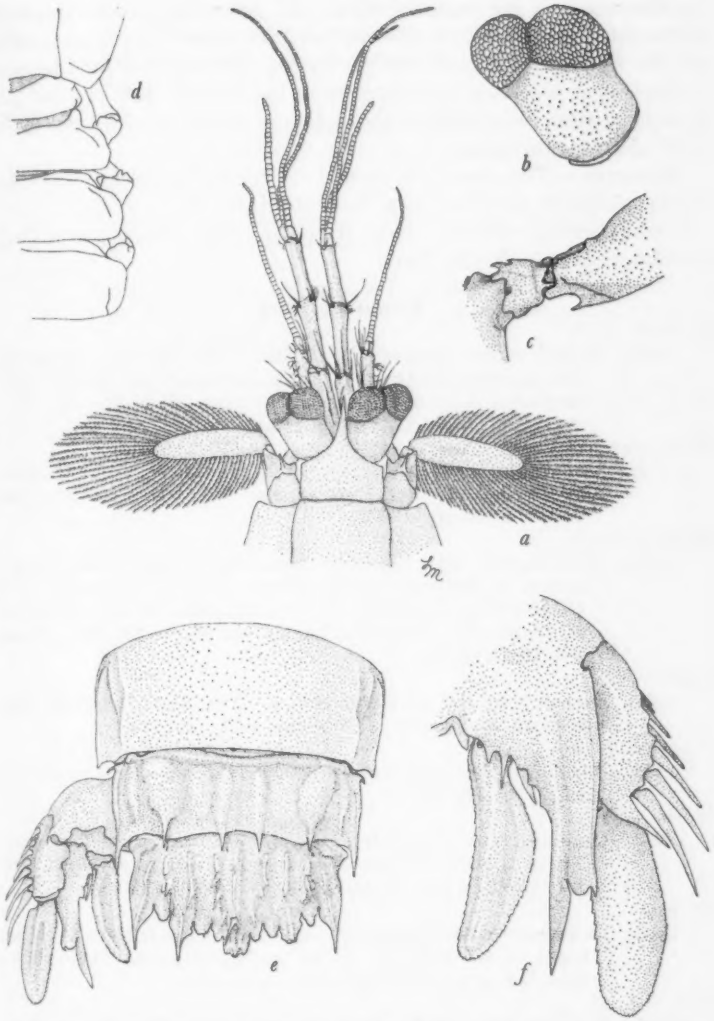

FIGURE 3.—*Manningia serenei*, new species, male holotype, Viet Nam: *a*, anterior portion of body; *b*, eye; *c*, carpus of raptorial claw; *d*, lateral processes of exposed thoracic somites; *e*, posterior portion of body; *f*, basal prolongation of uropod, ventral view, enlarged (setae omitted where damaged).

on the merus of the raptorial claw. *M. serenei* resembles the small fragmented specimen from the Gulf of Aden in having but one papilla on the antennal protopod and in having the rounded lobe between the spines of the basal prolongation of the uropod; the rounded lobe is much better developed in the holotype of *M. serenei* than in the Gulf of Aden specimen.

REMARKS.—This species is named for Raoul Serène in recognition of his studies on the Stomatopoda of the Indo-West Pacific.

DISTRIBUTION.—Known only from the type-locality, the Poulo Condore Islands, off Viet Nam.

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